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ev energy Response to Request for Information in Docket Number 20-FDAS-01

Additional submitted attachment is included below.

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November 1, 2021

Commissioner J. Andrew McAllister, Ph.D.
California Energy Commission
Docket Unit
Re: Docket No. 20-FDAS-01
715 P Street
Sacramento, CA 95814

Re: Request for Information in Docket Number 20-FDAS-01

Dear Commissioner McAllister and Commission Staff:

EV.ENERGY CORP ("ev.energy") appreciates the opportunity to provide information in response to the California Energy Commission's ("CEC") Request for Information ("RFI") for Flexible Demand Appliance Standards ("FDAS"), issued on September 1, 2021.

In accordance with Senate Bill ("SB") 49, the CEC is required to set minimum standards for appliances sold or leased within the state of California to promote flexible demand, ensure customer consent and protection, support grid operations, and ensure cybersecurity. The FDAS RFI seeks information on a number of appliances that can support demand flexibility, including electric vehicle supply equipment ("EVSE"). As a leading electric vehicle managed charging platform, we are able to directly control load on approximately 80% of the networked EVSEs deployed in California, along with significant deployments across the US and internationally. Based on our expertise leveraging EVSEs for load management, we make the following broad recommendations to the CEC:

1. The CEC should set an FDAS for EVSEs that will ensure every EVSE is smart-enabled "out of the box."
2. The CEC should accelerate the timeline for enacting the FDAS for EVSEs to Phase 1.

We expand on these recommendations below.

BACKGROUND ON EV.ENERGY

Ev.energy is a leading software platform that manages residential EV charging for utilities and grid operators through direct load control. With services and customers across all 50 U.S. states including a significant presence in California, we provide an end-to-end solution for utilities, retailers, and grid operators to actively manage residential EV load through a suite of Application Programming Interfaces ("APIs") that connect to both vehicle telematic systems and networked EVSEs such as ChargePoint and Siemens.

Ev.energy's software delivers multiple sources of value to grid operators, utilities and their residential customers. Ev.energy currently provides demand-response services by responding to California Independent System Operator ("CAISO") Flex Alerts and Emergency Load Reduction Program events. Ev.energy uses its vehicle telematics and EVSE APIs to curtail charging on all connected devices to deliver demand reductions during the specified windows and continuous dynamic load optimization at other hours. Beyond demand response, ev.energy also actively manages the EV driver's charging and shifts it to the off-peak hours on their time-of-use rate. In high-solar territories like California, ev.energy is further aligning EV charging with hours of high renewable generation and mitigating the 'duck curve.' By engaging and rewarding EV drivers for their participation through an award-winning mobile app, ev.energy enables more than 95% of the charging on its platform to be optimized in line with grid/utility signals, with the remaining 5% unmanaged through temporary customer overrides or opt-outs.

In summary, our managed charging software helps utilities, Community Choice Aggregators, and grid operators such as the CAISO to realize:

- *Reliable load shifting.* We are consistently shifting ~90% of EV loads to off-peak hours across PG&E's time-of-use rates;

- *Meaningful demand response (DR) curtailment.* By maximizing customer participation in DR programs and events we are able to deliver an average of 1.5 kW of load reduction per EV to CAISO and other grid operators;

- *Continuous renewable generation alignment.* We are aligning ~50% of the average California customer's EV charging with CAISO's low-carbon generation forecasts, reducing the carbon intensity of the electricity used to charge by as much as 70%;

- *Customer savings.* EV drivers in California are saving over $600/year on their EV charging by charging off-peak with ev.energy.[1]

GENERAL COMMENTS

Ev.energy supports California's efforts to require appliances, including EVSEs, to enable flexible demand management. Ev.energy strongly encourages the state to adopt standards that ensure that all EVSEs are smart-enabled. This "smart" capability can be achieved by adopting the following collective definitions of "smart":

- Connected to the internet via 3G/4G/5G or WiFi networks;
- Capable of sending and receiving charging data including plug-in status, energy and power demand;
- Responsive to dispatch signals that can be used to inform and optimize the rate of electricity flowing through a device and capable of changing the time at which electricity flows through the device
- Supportive of demand response services including OpenADR 2.0 protocol

[1] See BloombergNEF's analysis at https://about.bnef.com/blog/ev-drivers-save-big-when-they-charge-smart/.

- Accessible to the EV driver through at least one digital interface (we recommend a mobile app)

Our definitions of "smart" capabilities offered above build on the recent United Kingdom ("UK") government's "Electric Vehicle Smart Charging Government Response."[2] The UK government has committed to a phased approach that will finalize legislation mandating smart EVSEs by Spring 2022. This effort in the UK is a result of the Automated and Electric Vehicles Act 2018. Furthermore, the intent behind the rule is to "driv[e] the transition to a smarter and more flexible energy system,"[3] drawing strong parallels with the intent of the CEC FDAS RFI. We strongly encourage the CEC to take advantage of the groundwork and research already conducted by the UK government to help inform similarly strong standards and requirements in California.

We also encourage the CEC to align its FDAS adoption timeline with the current rapid uptake of EVSEs. California has set the aggressive goals of reaching 250,000 electric vehicle charging stations across the state by 2025 and five million zero-emission vehicles on the road by 2030.[4] To achieve these targets without straining the grid, EVSE deployment must similarly follow rapid deployment with EVSE standards that ensure the EVSE will actually be able to provide load flexibility. For these reasons, ev.energy believes that the CEC should accelerate the application of standards for EVSEs, which are currently listed for consideration in Phase 3. EVSEs are already an established technology. Furthermore, given the impact on the grid relative to other technologies under consideration, it would be appropriate to accelerate consideration of standards to support and maximize load shifting capabilities.

RESPONSES TO RELEVANT RFI QUESTIONS

1. For each appliance, are there additional examples that should be considered in scope or out-of-scope? Based on what factors?

Ev.energy supports the inclusion of Level 2 and direct current fast charging (DCFC) equipment in the CEC's scope. We suggest that the CEC also consider including Level 1 charging as an in-scope FDAS. While these chargers draw low levels of power, ev.energy and its partner (California-based EVSE manufacturer SmartenIt) are working to bring to market a "smart" L1 charging cable that meets the above definition and capabilities. Given that over 50% of California EV drivers charge at L1,[5] we believe it is critical that L1 chargers be included within the CEC's scope in order to maximize the grid and utility benefits of active load management. If the FDAS is not extended to L1 chargers, California risks precluding as many as 50% of light-duty/residential EVs from participating in load flexibility programs.

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[2] See July 2021 "Electric Vehicle Smart Charging: Government Response to the 2019 Consultation on Electric Vehicle Smart Charging, at p. 14, available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015285/electric-vehicle-smart-charging-government-response.pdf.

[3] Ibid, at p. 8.

[4] See https://www.cpuc.ca.gov/zev/

[5] See September 2018 UC Davis "Observed Charging Rates in California" Study, available at https://escholarship.org/uc/item/2038613r.

There is also an important equity consideration for the inclusion of L1 chargers. Critically, many customers, especially customers renting apartments or attached houses/condos tend to use Level 1 chargers. Data that ev.energy and its California partners have analyzed from CalEnviroScreen suggests that lower-income customers use these L1 chargers due to legal/landlord and household wiring constraints that prevent Level 2 installation.

4. What other flexible demand approaches are available for staff to consider? Please include references to publicly available sources.

Ev.energy believes that a critical component missing from the Commission Staff proposal is a requirement for *software* that will actually enable the EVSE to participate in load flexibility programs. Instead, Commission Staff proposes the following hardware and firmware capabilities to support demand flexibility:

- Delay capability
- Scheduling and clock capability
- Connected appliance
- Open Automated Demand Response
- American National Standards Institute/Consumer Technology Association (ANSI/CTA) 2045
- FM Broadcast

While these capabilities put forward by Commission Staff will enable EVSEs to be *technically* prepared to participate in load flexibility, there is no guarantee through these standards alone that EVSEs will *functionally* be able to participate right out of the box. This is because the proposed standards lack any requirement for software that will allow customers, utilities, and/or aggregators to connect to and utilize the hardware. To address this gap, ev.energy strongly believes that the FDAS for EVSEs should additionally require EVSEs to be accessible through at least one digital interface (e.g. a mobile app). We propose the following specific requirements to ensure software functionality:

APIs: APIs would ideally be available both through OEM telematics (which can similarly provide "smart" capabilities) and the EVSE hardware (L1/L2/DC). APIs allow aggregators to access and control the core functionalities that will enable participation in demand response and/or load flexibility, including changing the electricity flow rate and the time of electricity flow. APIs enable delay capabilities, scheduling and clock capabilities, and simply accessing information from the hardware.

Smart Functionality and Open Standards: An EVSE has smart functionality if it is able to send and receive charging data and respond to dispatch signals by increasing or decreasing the rate of electricity flowing through the charge post and shifting the time at which electricity flows through the charge post. To maximize flexible demand, all EVSEs deployed in California should be capable of supporting DR services.

The ev.energy platform can integrate with charge posts using a range of protocols and standards (e.g. OCPP 1.6, OCPP 2.0, OCPI, Proprietary and OCPP cloud-to-cloud) however, the most common current standard is OCPP 1.6J. Ev.energy's platform can enhance the functionalities of OCPP compliant equipment to be able to dynamically respond to user preferences and to DR events.

Personalized Default Settings: EVSEs should be focused on creating a seamless customer experience, and should provide the driver with a digital interface to set default charging hours before it is first used. For example, the driver could initially engage a mobile application and personalize their charging schedule. The device should also be pre-set with a charging schedule that does not charge EVs at peak times, a requirement that has been adopted by the UK government to prevent overload during the peak.[6]

After the initial setup, the application software can provide a number of additive functionalities to the driver. For example, it could provide active managed charging to the customer that will charge based on grid conditions and renewable generation forecasts. The application software could also dynamically respond to the driver's static or dynamic rate plan, allowing the driver to automatically charge their vehicle at the cheapest times without having to manually plug in or update the schedule themselves. The application software could even provide the means for a driver to use only locally-produced clean electricity (e.g. from their rooftop solar panels or home battery) to charge their vehicle.

22. What minimum standards are needed for cybersecurity of flexible demand appliances?

Ev.energy recommends that cybersecurity requirements be as stringent as practically possible, building on the landmark California Consumer Privacy Act.

Recent UK legislation, for example, requires that a "charge post" must have appropriate basic security measures to ensure that its functions are resilient to cyber-attack.[7] Furthermore, a charge post must be designed and manufactured to provide an adequate level of protection against physical damage to the charge point.

Specifically, UK requirements for EVSE cybersecurity are in line with the ETSI EN 303 645, a European cybersecurity standard for Internet of Things devices. There are 13 key requirements summaries in this specification, most of which can be applied to any existing hardware in combination with the ev.energy system.

The UK will adopt further standards in Phase 2 of its implementation of the EVSE standards. These include ETSI EN 303 645,[8] PAS 1878 (Energy smart appliances – System functionality and architecture),[9] and PAS 1879 (Energy smart appliances – Demand side

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[6] See July 2021 "Electric Vehicle Smart Charging: Government Response to the 2019 Consultation on Electric Vehicle Smart Charging, at p. 17, available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015285/electric-vehicle-smart-charging-government-response.pdf.

[7] Ibid. at p. 15.

[8] ETSI EN 303 645 Standards available at https://www.etsi.org/deliver/etsi_en/303600_303699/303645/02.01.01_60/en_303645v020101p.pdf.

[9] PAS 1878 Standards available at https://www.bsigroup.com/en-GB/about-bsi/uk-national-standards-body/about-standards/Innovation/energy-smart-appliances-programme/pas-1878/.

response operation).[10] California should consider the phase in of these, or functionally identical, standards.

In addition, California should consider standards that require EVSEs to be designed and manufactured with an adequate level of protection against physical damage to the hardware.

CONCLUSION

Electric vehicle charging is a significant and highly flexible load which, if properly managed, can be transformed from a liability into an asset for California's power grid. Standards should ensure that California utilities and grid operators are given the tools they need to call on flexible demand in a safe and reliable way. Ev.energy thanks the CEC for providing the opportunity to comment, and looks forward to working with the CEC and other stakeholders to develop and adopt appropriate standards. Please contact us with any questions.

Sincerely,

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[10] PAS 1879 Standards available at https://www.bsigroup.com/en-GB/about-bsi/uk-national-standards-body/about-standards/Innovation/energy-smart-appliances-programme/pas-1879/.